


Example #8: A 140 g ball is fastened to one end of a 0.24 m string, and the other end is whirled in a horizontal conical pendulum. Find:

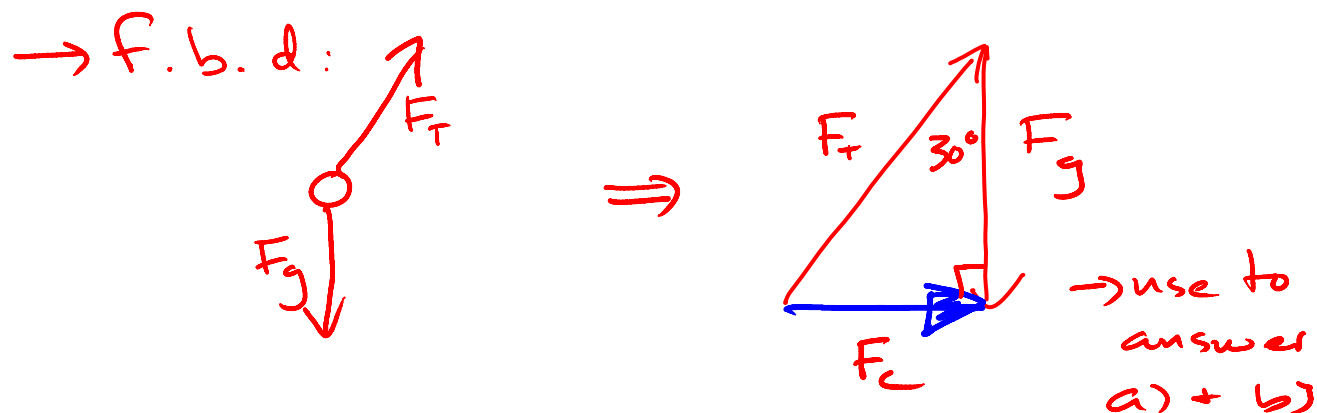
- the speed of the ball in its circular path;
- the tension in the string that makes an angle of 30° to the vertical.

→ find radius:



$$r = 0.24 \sin 30$$

$$= \underline{\underline{0.12 \text{ m}}}$$



$$a) \frac{F_c}{F_g} = \tan \theta \quad \frac{mv^2}{r} = mg \tan \theta$$

$$v = \sqrt{0.12 (9.8) \tan 30}$$

$$\boxed{v = 0.82 \text{ m/s}}$$

$$b) \frac{F_c}{F_T} = \sin \theta \quad F_T = \frac{F_c}{\sin \theta} = \frac{mv^2/r}{\sin \theta}$$

$$F_T = \frac{0.140 (.82)^2}{0.12 \sin 30}$$

$$\boxed{F_T = 1.6 \text{ N}}$$